In the Drawings

Please replace Figure 2 of the drawings on file with the attached amended Figure 2.

REMARKS

Claims 1-11 are pending in this application with claims 1-11 being amended by the current response.

Objection to the Drawings

The drawings are objected to for certain informalities. Figure 2 has been amended to more clearly illustrate the axes depicted therein in accordance with the comments of the Examiner. It is respectfully submitted that no new matter is added by these amendments. Therefore, it is respectfully submitted that this objection is satisfied and should be withdrawn.

Objection to the Specification

The specification is objected to for certain informalities. The specification has been amended for purposes of clarity, grammar and to correct typographical errors in accordance with the comments of the Examiner. It is respectfully submitted that no new matter is added by these amendments. It is thus further respectfully submitted that this objection is satisfied and should be withdrawn.

Objection to claims 1-11

Claims 1-11 are objected to for certain informalities. The claims have been amended for purposes of clarity and to correct typographical errors in accordance with the comments of the Examiner. It is respectfully submitted that no new matter is added by these amendments. It is thus further respectfully submitted that this objection is satisfied and should be withdrawn.

Rejection of Claims 2 and 11 under 35 USC § 112, second paragraph

Claims 2 and 11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The present invention, as described in claim 2, describes a method wherein the selected pixels of an image constitute one or more regions. Weights are calculated and allocated to the pixels of the image depending on whether or not they belong to the regions and on the geometrical characteristics of the regions to which they belong in the image. A new selection of the pixels is performed depending on the resolution and weight values assigned to the pixels.

Weights are calculated as a function of the size of the region or the quantity of points selected in the image (page 7, lines 7-12). A first selection must be made to calculate the weights which are used, consequently, requiring a new selection subsequently.

Masks are initialized to the value 0 at the first iteration and the weights are therefore at the unit value. A weight calculation is made for the first pass according to the percentage of matched pixels, giving the same weight for all the pixels of the image (page 7, lines 17-24). Weights are calculated according to the size of the regions (made up of selected pixels) or number of selected pixels (page 7, lines 7-16).

Two kinds of weighting correspond to the same step 4 on fig.1 but they depend on the iteration number. The weights, mentioned in claim 2, are calculated as a function of regions and size of the regions and consequently to an iteration different from the first iteration.

Claim 2 specifies that the selected pixels constitute regions. The pixels are first selected then the selected pixels are grouped in regions. Subsequently a new selection is then implemented among previously selected pixels. This is consistent

with the disclosure when we consider the selected pixels correspond to the first iteration (selection step in claim 1) and the new selection corresponds to iteration (claim 2).

Claim 11 has been amended in accordance with the comments from the Examiner.

In view of the above remarks and amendments to the claims, it is respectfully submitted that this rejection is satisfied and should be withdrawn.

Rejection of Claims 1, 9 and 11 under 35 USC § 102(e)

Claims 1, 9 and 11 are rejected under 35 U.S.C. 102(e) as being anticipated by Davidson et al.

The present claimed invention recites a method for constructing a 3D scene model by analyzing image sequences. Each image in the sequence corresponds to a viewpoint defined by its position and its orientation. The method includes calculating, for an image, of a depth map corresponding to the depth, in 3D space, of the pixels of the image. Next, calculating, for an image, of a resolution map corresponding to the 3D resolution of the pixels of the image, from the depth map is performed. A pixel of a current image is then matched with a pixel of another image of the sequence, pixels relating to one and the same point of the 3D scene, by projecting the pixel of the current image onto the other image. Then, a pixel of the current image is selected depending on its resolution and on that of the pixels of other images of the sequence matched with this pixel. A 3D model is then constructed from the selected pixels. The invention relates to a process for constructing a 3D scene model by analyzing image sequence. The present invention aims to create a process allowing for improvement in the possibilities of navigation in the virtual scene.

Davidson et al. disclose an apparatus and method for creating three-dimensional models of an object. The images of the object are taken from different

unknown positions are processed to identify the points in the images which correspond to the same point on the actual object.

Referring to fig 45a, the cluster of points 90 in the three-dimensional space comprises four points. The points correspond to a single point on the surface of the actual object 24 (see lines 60-65, column 43). Points #1 (92) and #2 (96) are the points respectively generated from the first and second pair of images (i.e. camera positions), points #3 and #4 from the third and fourth pair. Each of these points corresponds to a same point of the 3D object. Shifts are errors corresponding to the distances between these points. The shift is compared to a threshold to determine the accuracy of the related points.

A characteristic of the present claimed invention is the selection of the pixels according to the 3D resolution. The 3D resolution is defined in the specification (page 5, lines 14-21). A depth map is calculated for the pixels of the image. For a current pixel, its 3D resolution depends on the depth of neighboring 2D pixels. The range of the depth values of these pixels determines the resolution. Davidson et al. disclose a shift relating to a single point in the space. This is unlike the present claimed invention which discloses a 3D resolution which allows selecting the pixels. Therefore, even though Davidson et al. disclose a shift relating to a single point in space, Davidson et al neither disclose nor suggest "calculation, for an image, of a resolution map corresponding to the 3D resolution of the pixels of the image, from the depth map [nor] selection of a pixel of the current image depending on its resolution and on that of the pixels of other images of the sequence matched with this pixel" as claimed in claim 1 of the present invention.

As claims 9 and 11 are dependant on claim 1 it is respectfully submitted that these claims are allowable for the same reasons as discussed above.

In view of the above remarks and amendments to the claims it is respectfully submitted that there is no 35 USC 112 compliant enabling disclosure in Davidson et al. showing the above discussed features. It is thus further respectfully submitted that

claims 1, 9 and 11 are not anticipated by Davidson et al. It is thus, further respectfully submitted that this rejection is satisfied and should be withdrawn.

Rejection of Claim 2 under 35 USC § 103(a)

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Davidson et al., in view of Azarbayejani et al. (U.S. Patent 5,511,153).

Azarbayejani et al. recite a method and apparatus for generating a three-dimensional, textured computer model from a series of video images. The invention operates by tracking a selected group of object features through a series of image frames, and based on their relative positions, estimates parameters. Similarly to Davidson et al., Azarbayejani et al. neither disclose nor suggest "calculation, for an image, of a resolution map corresponding to the 3D resolution of the pixels of the image, from the depth map [nor] selection of a pixel of the current image depending on its resolution and on that of the pixels of other images of the sequence matched with this pixel" as claimed in claim 1 of the present invention.

Additionally, the combined system of Davidson et al. and Azarbayejani et al neither discloses nor suggests "calculation, for an image, of a resolution map corresponding to the 3D resolution of the pixels of the image, from the depth map [nor] selection of a pixel of the current image depending on its resolution and on that of the pixels of other images of the sequence matched with this pixel" as claimed in claim 1 of the present invention.

In view of the above remarks and amendments to the claims it is respectfully submitted that there is no 35 USC 112 compliant enabling disclosure in Davidson et al. in view of Azarbayejani showing the above discussed features. It is thus further respectfully submitted that claim 1 and dependant claim 2 are not anticipated by Davidson et al. in view of Azarbayejani. It is thus, further respectfully submitted that this rejection is satisfied and should be withdrawn.

Rejection of Claims 4, 5 under 35 USC § 103(a)

Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Davidson et al., in view of McAllister et al. (Real-Time rendering techniques of real world environments).

McAllister et al. recite an end-to-end system for acquiring highly detailed scans of large real world spaces, consisting of forty to eighty million range and color samples, using a digital camera and laser rangefinder. Similarly to Davidson et al., McAllister et al. neither disclose nor suggest "calculation, for an image, of a resolution map corresponding to the 3D resolution of the pixels of the image, from the depth map [nor] selection of a pixel of the current image depending on its resolution and on that of the pixels of other images of the sequence matched with this pixel" as claimed in claim 1 of the present invention.

Additionally, the combined system of Davidson et al. and McAllister et al neither discloses nor suggests "calculation, for an image, of a resolution map corresponding to the 3D resolution of the pixels of the image, from the depth map [nor] selection of a pixel of the current image depending on its resolution and on that of the pixels of other images of the sequence matched with this pixel" as claimed in claim 1 of the present invention.

In view of the above remarks and amendments to the claims it is respectfully submitted that there is no 35 USC 112 compliant enabling disclosure in Davidson et al. in view of McAllister showing the above discussed features. It is thus further respectfully submitted that claim 1 and dependant claims 4 and 5 are not anticipated by Davidson et al. in view of McAllister. It is thus, further respectfully submitted that this rejection is satisfied and should be withdrawn.

Rejection of Claim 10 under 35 USC § 103(a)

Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Davidson et al., in view of La Roux et al. (An Overview of Moving Object Segmentation in Video Images, IEEE, 1991).

La Roux et al. disclose a method for modelling a 3D object from an image sequence. 3D objects are modelled by combining state-of-the-art algorithms for un-calibrated projective reconstruction, self calibration and dense correspondence matching. Similarly to Davidson et al., La Roux et al. neither disclose nor suggest "calculation, for an image, of a resolution map corresponding to the 3D resolution of the pixels of the image, from the depth map [nor] selection of a pixel of the current image depending on its resolution and on that of the pixels of other images of the sequence matched with this pixel" as claimed in claim 1 of the present invention.

Additionally, the combined system of Davidson et al. and La Roux et al neither discloses nor suggests "calculation, for an image, of a resolution map corresponding to the 3D resolution of the pixels of the image, from the depth map [nor] selection of a pixel of the current image depending on its resolution and on that of the pixels of other images of the sequence matched with this pixel" as claimed in claim 1 of the present invention.

In view of the above remarks and amendments to the claims it is respectfully submitted that there is no 35 USC 112 compliant enabling disclosure in Davidson et al. in view of La Roux showing the above discussed features. It is thus further respectfully submitted that claim 1 and dependant claim 10 are not anticipated by Davidson et al. in view of La Roux. It is thus, further respectfully submitted that this rejection is satisfied and should be withdrawn.

Having fully addressed the Examiner's rejections, it is believed that, in view of the preceding amendments and remarks, this application stands in condition for allowance. Accordingly then, reconsideration and allowance are respectfully solicited.

If, however, the Examiner is of the opinion that such action cannot be taken, the Examiner is invited to contact the applicant's attorney at the phone number below, so that a mutually convenient date and time for a telephonic interview may be scheduled.

No fee is believed due. However, if a fee is due, please charge the additional fee to Deposit Account 07-0832.

Respectfully submitted,
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Date: December 6, 2004

Linda Tindall